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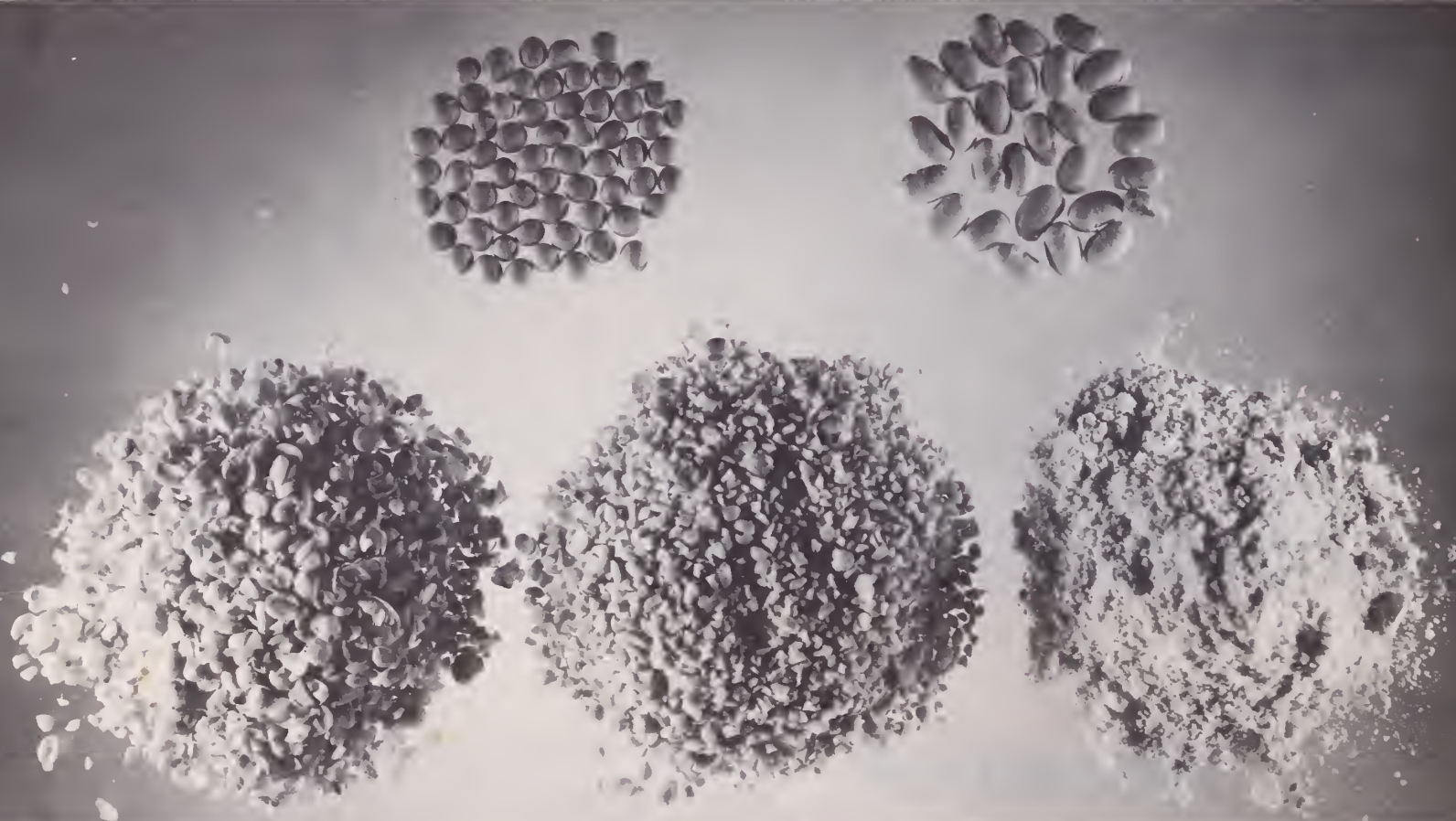
WEED EATING INSECTS—Basic entomological research in USDA is trying to determine why some insects choose certain plants for food and egg laying and avoid others. Results could lead to wider and more effective use of insects as biological weapons against weeds. An example of a weed-eating insect is this three-lined potato beetle feeding on the leaf of a host plant; the beetle's egg cluster is at the lower right. This insect is particularly suitable for this kind of research because its egg laying and feeding habits are restricted. In future experiments scientists will try to determine how insects respond to the color, size, shape, texture, and chemical properties of plants. PN-1402

Research Roundup 1966

Scientists in the U.S. Department of Agriculture's Agricultural Research Service conduct a host of regulatory and research programs—as different as hog cholera eradication is from heat treatment for protecting peaches—contributing to our nation's agricultural abundance. Here are some examples of their progress in 1966.



TEMPEH—ARS scientists are constantly searching for new uses for farm products. The results may provide greater outlets for farm commodities, new convenience foods for the United States, or new protein-rich foods for developing countries where protein is scarce. Here, biochemist H. L. Wang freeze-dries tempeh—a centuries-old Indonesian soybean food. Traditional Indonesian tempeh is made from soybeans fermented by several different strains of mold. In the new process, a purified strain of the mold produces satisfactory cereal tempeh. The new tempehs can be baked, deep fried, or used as ingredients in other foods. PN-1393



SOYBEAN FLOUR—Department of Agriculture efforts to find new high-energy, high-protein foods for hungry countries has resulted in development of a process to make raw soybeans (top left) into a soybean flour (bottom right) that has none of the nutritious soybean oil removed. The simple process requires only inexpensive, readily available equipment. Related research is developing information on the nutritive value of soybean flour, and its use in foods for infants and children, and in traditional foreign dishes. In the five-step process, soybeans are soaked overnight in water containing one percent soda bicarbonate; boiled 10 to 15 minutes; air dried, cracked, dehulled, and finally ground into flour. The work is financed by the Agency for International Development (AID). BN-26833



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SAVING WATER—(above) Millions of gallons of precious water for irrigation escape each year through cracks in irrigation canals. ARS workers in cooperation with the Arizona Agricultural Experiment Station and the Salt River Project of Arizona developed an effective sealer made of asphalt, butyl latex, and asbestos fiber that can be sprayed on the cracks with a high pressure hose and nozzles. The new sealer is more effective than previous sealers because it forms a chemical bond with the concrete canal surface. Here, workmen apply the sealer to canal cracks. They can treat 800 feet of cracks by this method in one hour. PN-1350 **VIRUS-FREE STRAWBERRY PLANTS** (below) are being produced by ARS plant pathologists by using tiny tips of stem tissue cut from plants infected with latent C-virus. Infected plants were used because researchers were unable to locate virus-free stock. The virus was prevented from moving to the tips of the runners by holding the plants in a heat chamber, lower left, for several days. ARS releases new varieties of plants to State Departments of Agriculture and Experiment Stations. These agencies increase the plant numbers and redistribute them to selected nurserymen. Nurserymen, in turn, propagate the plants for sale to commercial growers and home gardeners. At lower right, a runner tip is placed in a jar with sterile nutrient agar for rooting. ST-363-26, ST-364-13



SOYBEAN FLOUR—Department of Agriculture efforts to find new high-energy, high-protein foods for hungry countries has resulted in development of a process to make raw soybeans (top left) into a soybean flour (bottom right) that has none of the nutritious soybean oil removed. The simple process requires only inexpensive, readily available equipment. Related research is developing information on the nutritive value of soybean flour, and its use in foods for infants and children, and in traditional foreign dishes. In the five-step process, soybeans are soaked overnight in water containing one percent soda bicarbonate; boiled 10 to 15 minutes; air dried, cracked, dehulled, and finally ground into flour. The work is financed by the Agency for International Development (AID). BN-26833



CAMPTOTHECA TREE—(above) Substances extracted from flowers (left) and developing fruit (center and right) of an obscure Chinese tree may have promise for arresting leukemia in humans. The tree, camptotheca, is the only known source of camptothecin, a material that has shown anti-tumor activity in tests on laboratory animals implanted with an experimental type of leukemia. More research is needed before the material can be tested on humans. The camptotheca tree was first introduced into the United States in 1933 by Department of Agriculture plant explorers. PN-1382 **DR. EDWARD F. KNIPLING** (photo left) being congratulated by Secretary of Agriculture Orville L. Freeman (left), is a 1966 winner of the Rockefeller Public Service Award—the highest privately sustained national honor for Federal career officials. Dr. Knipling received the award for developing and applying the male-sterile technique of insect control. The technique has been used in the southeast United States to eradicate the screwworm, a costly pest of cattle. Effective control has been achieved in the southwest, too. Dr. Knipling joined the Department of Agriculture in 1930. He has been Director of the Entomology Research Division since 1953. ST-1676-10



HEAT TREATMENT—protects some fruits and vegetables from decay-producing organisms that destroy or damage the products before they reach the consumer. Here, scientists at the Agricultural Research Center, Beltsville, Maryland, test the effect of immersing peaches in hot water to prevent decay. Hot water or hot air treatments have prevented decay in 14 different fruits and vegetables without injuring the commodities. Cantaloupes, peaches, mangoes, bell peppers, and lemons are already being heat treated commercially. Potential advantages of heat treatment are impressive: it is cheaper and easier to apply than chemical protectives, and does not leave undesirable residues. Insert shows peaches that have been heat treated (Top) compared with spoiled ones that have not. PN-1420, PN-1421

ROLE OF CARBOHYDRATES—These two coeds, along with eight others, volunteered to eat controlled diets and to help analyze their body reactions in basic studies to discover the role of carbohydrates in food. Earlier research with laboratory animals had indicated that different carbohydrates produce different effects. In these tests, the girls tried two diets during alternate 30-day periods. One group first consumed a balanced diet in which the primary carbohydrate was sugar, then a balanced diet in which starch was the main carbohydrate. Other girls consumed the same diets in reverse order. Cholesterol level in blood of women on high-starch and high-sugar diets did not differ materially. Earlier studies of men by other scientists apparently indicated that high-sugar diets go along with higher blood cholesterol levels. Ten college men are also taking part in this study, but data on them has not yet been processed. BN-27009



HOG CHOLERA—a disease that adds \$50 million a year to the cost of producing the nation's pork, is being eradicated from the United States. The target date for a "cholera free United States" is 1972. Twenty-five States are now in the final two phases of a four-phase hog cholera eradication campaign. Each phase represents a gradual buildup in the campaign. The first two phases aim to reduce the disease to as low a level as possible. The final two phases provide for eliminating all outbreaks and protecting against reinfection. Here, an official inspects a group of market hogs for signs of disease. N-32707



MORLAM—This ewe (center front) gave birth to these lambs, two sets of twins plus a singly born lamb, between May 1965 and September 1966. Put another way, only eight months were required between each new birth. Sheep normally lamb only once a year. Year-round lambing is unusual because most ewes do not mate between February and July, and reach maximum fertility only in late summer and early fall. ARS geneticists hope to develop a new strain of sheep—to be called Morlam (more lamb)—with such economically important traits as year-round births, heavy fleeces, hornlessness, and white, open faces. If they are successful each breeding ewe would produce about 50 percent more lambs than ewes giving birth to lambs only once a year. ST-1768-6

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